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ABSTRACT

Sixteen subjects with autism and 16 with Down Syndrome (aged 5 to 27), matched on verbal mental age, watched a short puppet show or video skit and were then asked to tell the story to a listener and answer follow-up questions. The majority of both groups were able to produce recognizable, though primitive, narratives. The groups did not differ in general story characteristics, and both groups exhibited errors in language use. Subjects with autism had a greater tendency to produce bizarre language and adapt an "externalized" point of view in which the puppets/actors were seen as objects rather than characters. Down syndrome subjects produced significantly more communicative gesture. Although the groups were about equally able to supply information for follow-up questions, autistic subjects produced a higher proportion of bizarre responses. These responses were considered to be a manifestation of the pragmatic deficits exhibited by autistic subjects. Results indicate that the story recall ability of autistic subjects resembles that of language-matched mentally retarded persons. However, autistic subjects had more difficulty grasping the story as a representation of meaningful events. Results are discussed in relation to the autistic person's awareness of listener's needs and aspects of the social environment. (Author/JDD)

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Narrative Story-Telling in Autism and Down Syndrome

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Running Head: NARRATIVE STORY-TELLING

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Abstract

The present study investigated the ability of high-functioning verbal children and adolescents with autism or Down Syndrome to tell a story to a listener. Sixteen subjects with autism and 16 with Down Syndrome (DS), matched on verbal mental age, watched a short puppet show or video skit and were then asked to tell the story to a listener and answer follow-up questions. The majority of both groups were able to produce recognizable, though primitive, narratives. The groups did not differ in general story characteristics and both groups exhibited errors in language use. Subjects with autism had a greater tendency to produce bizarre language and adapt an "externalized" point of view in which the puppets/actors were seen as objects rather than characters. Also, DS subjects produced significantly more communicative gesture. Although the groups were about equally able to supply information for follow-up questions, autistic subjects produced a higher proportion of bizarre responses. Results indicate that the story recall ability of autistic subjects resembles that of language-matched, mentally retarded persons. However, autistic subjects had more difficulty grasping the story as a representation of meaningful events. Results are discussed in relation to the autistic person's awareness of listener's needs and aspects of the social environment.

Narrative Story-Telling in Autism and Down Syndrome

Autism is characterized by severe impairments in communication and social interaction skills (American Psychiatric Association, 1980; Denckla, 1986; Baker, Cantwell Rutter and Bartak, 1976). It has become increasingly apparent that the language problems of persons with autism are uniquely affected by their social deficits (Bartak, Rutter & Cox, 1975; Tager-Flusberg & Quill, 1987; Baltaxe, 1977). Social abnormalities such as non-reciprocal speech are present even in autistic persons of normal intelligence (Dewey and Everard, 1974; Baron-Cohen, 1988) . Thus, even when relatively well-developed language skills are present, the ability to communicate effectively with a listener may be significantly impaired (Loveland, Tunali, Kelley & McEvoy, in press). Because they involve awareness of social context and cultural expectations, sophisticated linguistic skills such as telling stories pose unusual challenges for the person with autism.

Children's story narratives can provide valuable information about how they have perceived and encoded information, as well as their ability to communicate information to a listener. Narrative story-telling requires a variety of cognitive and linguistic skills including understanding of causal, intentional, spatial and role relationships and an ability to tell a story in an appropriate rhetorical mode (Graesser, 1981; Klecan-Aker, 1985). These skills develop gradually over the course of childhood (Applebee, 1978; Klecan-Aker, McIngvale & Swank, 1987). Pre-school children can tell stories, but they require additional structure from adults in order to produce a

coherent, relevant narrative (Kontos, Mackley, & Baltos, 1986). By grade school, children are able to tell stories complete with a plot and a distinct beginning, middle and end (Applebee, 1978), although as Kontos et. al. (1986) observed, narrative ability is related more to language ability than to chronological age.

The effect of developmental language impairment on narrative story-telling has been explored in several studies involving language-disabled and reading-disabled children. Reading-disabled children have been found to produce narratives that were poorer in content and less complex, although their story comprehension was similar to that of non-disabled controls (Feagan & Short, 1984). Language-disabled children were found to tell told shorter stories with fewer episodes than those of non-disabled children (Roth & Spekman, 1986) and made more unacceptable departures from a text they were recalling (Liles & Purcell, 1987).

Little is known about the narrative ability of children with autism. Tager-Flusberg & Quill, (1987) found that high-functioning, verbal autistic persons can tell stories based on a series of pictures, but that when compared to those of normal controls, their stories are shorter and less complex with more lexical and syntactical errors. In addition to linguistic deficits, however, lack of social awareness may also affect the quality of narrative speech (Baltaxe, 1976; Loveland & Landry, 1986; Loveland, Tunali, Kelley & McEvoy, in press). For example, some researchers have hypothesized that the central deficit of autism involves a deficiency in the ability to attribute mental states to others ("theory of mind") (Baron-Cohen, Leslie & Frith, 1985; Baron-Cohen, 1988). Such a deficiency might result in at least two problems for the speaker with autism who is attempting to tell a story or describe events. First, the person with autism may not understand some socially

meaningful aspects of the event to be discussed such as another person's affect or motivation, the relationships among people or the reasons for others' actions. Secondly, the person with autism may be unable to select, organize and present information adequately to others, because of difficulty anticipating what the listener needs to know. These problems would be reflected not only in story-telling, but in conversational skills in every day situations.

It has not been shown, however, that the narrative speech of verbal persons with autism is different from that of other developmentally delayed persons of similar levels of language ability. It should therefore be important to make comparisons with other developmentally delayed groups to determine whether any characteristics of narrative speech in persons with autism are specific to that population.

The present study deals with the narrative story-telling ability of high-functioning children and adolescents with autism compared with that of language-matched, mentally retarded persons with Down Syndrome (DS). In some previous studies of children's stories, narratives were created by the child about a topic of the child's choosing; in others, the story was a retelling of a prepared text; in still others, a set of pictures or other stimulus depicting a story was used as a basis for a child's story. For several reasons, we chose to use a story skit, acted out by puppets or actors, as a stimulus. First, we wished to examine narrative story telling not only as a special rhetorical mode, but also as an example of the child's ability to describe everyday events to a conversational partner; thus a dynamic stimulus depicting characters interacting was necessary. Secondly, we wished to have a basis for direct comparison among subjects' stories, which might otherwise be very different in content and length. Finally, we wished to examine subjects'

understanding of meaningful aspects of events they observe, such as emotions or motives. Follow-up questions concerning the story were therefore given in order to examine subjects' comprehension of factual and affective story content, as well as the possible implications of story events.

Several issues were addressed:

1) Can autistic and DS subjects compose and relate a story to a listener based on a set of events they have viewed? How do their stories compare in quality, including organization, accuracy and clarity?

2) How do the autistic and DS subjects' narratives compare in pragmatic aspects such as relevance to topic, awareness of listener's need for information, comprehension of the story as a representation, and use of appropriate communicative gesture?

3) How well do autistic and DS subjects understand the meaning of events in a story, in particular factual and affective content, and the implications of events?

Method

Participants

Sixteen high-functioning individuals with autism and sixteen with Down syndrome were compared in the study. Participants were between the ages of five and twenty-seven years of age (autism mean = 13.5 yrs, SD = 7.1 yrs; Down syndrome mean = 13.3 yrs, SD = 2.9 yrs). Subjects were recruited through private referrals, through the Parents of Children with Down Syndrome, and through local chapters of the Association for Retarded Citizens. All participants were seen at the University of Texas Mental Sciences Institute, Developmental Neuropsychology Clinic.

Each subject was first seen for a developmental evaluation to determine verbal and nonverbal intelligence. Developmental evaluations took

approximately one-and-one-half hours to complete. An approximate verbal mental age equivalent was determined using the McCarthy Scales of Children's Abilities - Verbal Scale (McCarthy, 1972) and the Peabody Picture Vocabulary Test (Dunn & Dunn, 1981), according to a method devised by Loveland and Kelley (1988). The McCarthy was employed because it measures a variety of expressive and receptive language skills at an age commensurate with the language abilities of the subjects in both groups. Because the McCarthy does not give a verbal mental age equivalent for individuals over eight years of age, for most participants an approximate age equivalent was derived based on the average levels of performance for particular age levels as given in the McCarthy norms. These age equivalents were combined with the individual's age equivalent on the PPVT. The mean of these two scores was used as an approximate verbal age equivalent.

Nonverbal intelligence was assessed using the Leiter International Performance Scale (Arthur, 1980). The Leiter is a completely nonverbal instrument that measures nonverbal intelligence two years of age and above. The Leiter has been widely used and recommended for children and adults with autism (Shah & Holmes, 1985). Table 1 gives the chronological age, and verbal and nonverbal age equivalents, as well as the means and standard deviations for the two groups.

Table 1 about here

The Vineland Adaptive Behavior Scales (Sparrow, Cicchetti, & Balla, 1984) were used to assess adaptive behavior, for the purpose of determining an approximate level of socialization skills. The Vineland is a nationally standardized measure of adaptive behavior that has been recommended for use

with persons with autism and other developmental disabilities (Deckner, Soraci, Deckner, & Blanton, 1981; Volkmar, Sparrow, Goudreau, Cicchetti, Paul, & Cohen, 1987).

Matching

The autism and Down syndrome groups were individually matched on composite verbal age equivalent to ensure that any observed differences were not due to differing language ability between the two groups. Nonverbal intelligence and chronological age were kept as similar as possible between the two groups. (See Table 1.)

Procedures

After the developmental evaluation, the subject took a short break. The subject was then brought back into the testing room and asked to watch a story presented as a puppet show or a video taped skit with actors. Subjects were told that they would be asked some questions about the presentation after its completion. Two forms of story presentation were used because of the differing levels of social maturity represented among subjects (see Appendix A). All subjects under fourteen years of age viewed the puppet show (The Chicken and the Fox). Subjects over fourteen years of age and who also had a Vineland Socialization age equivalent of twelve years or greater saw a videotaped skit with human actors that corresponded closely to the story of the puppet show (The Secretary and the Thief). Equal numbers of subjects in each group received the puppet show (13) and the skit (3).

The two story presentations were constructed to be parallel in content and structure. Each involved a central character and a thief who tries to steal something from the central character, but is driven away. Length of stories and number of characters and events were the same.

Each story was presented twice. After the second time an experimenter who was not present during the story presentation, but who was known to the subject, entered the room. She then asked, "Tell me about the story. What happened in the story?" in order to elicit a narrative account. If needed, the experimenter gave additional general prompts such as "What else happened in the story?" until the subject no longer provided any new information or the subject said he or she was finished. Subjects' responses were videotaped through a two-way mirror.

Subjects were then asked specific followup questions designed to assess their knowledge of factual events from the story, understanding of affective information from the story, and ability to speculate about the implications of themes given in the story. Questions were presented once; they were repeated only if the subject did not appear to understand the question or was not attending at the time it was asked. Responses were again videotaped.

Coding

Story narratives and responses to questions were transcribed from the videotape of the session by a team of two coders. The use of gesture was also recorded during transcribing. Data were collected from the transcriptions of narratives and responses.

Transcriptions of narratives were first reviewed for components that reflected the general quality of the narration. Variables of interest were the number of words in the narrative, the number of story segments (events) given, and the number of characters or objects mentioned. Also of interest were unclear references to characters or events, misinterpretations of story events, repetitions of previously mentioned material, intrusions of material not part of the story (an "external" point of view on the story) and "external references" in which characters were viewed as objects rather than

meaningful parts of the story. Gestures used by subjects to elaborate on narratives were recorded descriptively in the transcriptions (ex. Subject made hammering motions when describing how the chicken chased the fox away).

Responses to follow-up questions were coded using one of three coding schemes depending on the type of question. (See Appendix B for sample responses for all categories.) Responses to follow-up questions pertaining to concrete factual events in the story were coded on a 5 point scale ranging from no response (0), irrelevant or inappropriate (1), marginal or loosely associated with the question (2), minimally adequate (3) and adequate, well-produced responses (4). Responses to questions pertaining to emotion or motivation of characters were coded on a different 5 point scale: as no response (0), bizarre or inappropriate responses (1), concrete responses (2), stereotypical responses (3), and adequate or appropriate responses (4). Responses to questions requiring speculation or extrapolation were categorized as no response (0), bizarre or inappropriate responses (1), adequate responses (2), and responses exhibiting an ability to creatively speculate or draw conclusions (3).

Responses were coded by four coders working in pairs. Re-coding for reliability was done by independent pairs of coders on 25% of the data (8 subjects randomly selected). The mean percent agreement in determining response categories was 92%, with a range from 80-98%.

Results

Group Characteristics

The autistic and Down syndrome groups were compared using t-tests on mean scores for verbal age equivalents (AE), nonverbal AE (Leiter), chronological age (CA), and gender. The groups did not differ on CA or verbal AE. However, the group with autism did have a higher mean nonverbal AE than the group with Down syndrome, $t(30) = 2.29$, $p < .05$. This finding most likely reflects the special difficulty experienced by individuals with autism in language-based skills relative to their other skills.

In addition, the groups differed in gender, with the autistic group composed of 15 males and 1 female ($t(30) = 2.63$, $p < .05$). Differences in gender between the two groups reflect characteristic sex-ratios found in these populations.

Group Differences in Narratives

T-Tests revealed no significant differences in number of words, number of story events recalled, or number of objects mentioned (number of specific characters or props) between the two groups in their narratives (see Table 2). Subjects in both groups occasionally required prompting to tell the story as completely as possible. There was no difference in the number of prompts given to the groups as a whole (45 prompts given to autistic subjects; 44 prompts given to DS subjects). There was a great deal of within group variance on these variables consistent with the range of cognitive and language skills in the two groups.

Subjects in both groups exhibited errors in language pragmatics that resulted in ambiguity or irrelevent information in their narratives (see Table 2). Because only some subjects in each group made any given error, the data were not normally distributed. For this reason, Chi Square analysis was used

to test for significant differences in the number of subjects within a group who made a particular pragmatic error. An approximately equal number of subjects in each group displayed repetitions, intrusions and misinterpretations, and unclear references (e.g., ambigous pronominal anaphora) (Table 2). External references, in which the characters were seen as objects rather than as meaningful actors (e.g. "Puppets, they moved their mouths...they went up and down."), were exhibited by 37% of the autistic group (6 subjects) and only 6% of the DS group (1 subject) (χ^2=4.56, $p<.05$).

It is interesting that even the most socially and verbally advanced autistic subjects had difficulties of this nature. These subjects were shown the videotaped skit with human actors, which might be expected to lessen the likelihood of pragmatic errors of the kinds observed with the puppet show. In fact, although none of these three subjects failed to discern the meaning of the story events, two of them made statements after the presentation indicating that they did not understand the events to be fictional, although this had been clearly explained.

Insert Table 2 here

Qualitative Comparison of Narratives

The pragmatic deficits of the autistic group are illustrated by qualitative comparison of their narratives with those of the DS group. One of the more striking characteristics of the autistic group was a tendency to give narratives that failed to capture the idea of the story as a representation of fictional events, i.e. as a special kind of symbolic activity determined by social context.

1. Fox puppet, that chicken. . . (prompt) Chicken, the puppet,

I like eggs. Chicken. . . (prompt) Get the egg, chicken get the egg. . . (prompt) Get the egg, puppet, chicken and the egg, puppet and the egg.

(Autistic male, CA:16;10, Verbal MA:4;4, Nonverbal MA:5;6)

Repeated references to "the puppet" in the above narrative suggest that this subject was unable to view the puppet as a character rather than simply a hand puppet. Some story content is present, but it is greatly reduced and somewhat distorted (e.g., in the story the fox, not the chicken, tries to get the egg). One character's words are repeated ("I like eggs"), but no context is given. Despite repeated prompts to continue, little new information is produced, and no story organization is present. Another autistic subject's narrative lacked story content altogether:

2. That hammer over there. . . (prompt) That egg and the nest and the puppet. . . (prompt) They opened their mouths, they talk. . . (prompt) The animals say something. . . (prompt) the puppets. . . (prompt) the green and the red . . (prompt) They are called animal puppets. . . (prompt) the animal puppets. . .(prompt) the story tells about the animals . . .were talking. . they talk. . (prompt) they say hello. . . (prompt) they say start over again. . they said they open their mouths and keep their mouths shut, they speak, they're talking about /pee vee/ the puppets are talking to each other (prompt) they say gobble gobble.

(Autistic male, CA:13;11, Verbal MA:4;11, Nonverbal MA:8;7)

Compare these subjects' narratives with that of a subject from the DS group with very similar verbal mental age:

3. The fox tried to eat the egg and the bird got a hammer and

hit him and he walking and bang, the hammer was banging. The fox took the egg and the bird was mad and took the hammer and hit him and ate it.

(Down Syndrome male, CA:12;1, Verbal MA:4;3, Nonverbal MA:5;0)

This narrative preserves a simple plot structure, including the central conflict and resolution. Though some elements of the story are placed out of order, repeated, or distorted, they form a recognizable story rather than a collection of unrelated events.

Subjects in both groups who had a higher verbal mental age tended to produce narratives that were more elaborated and well-formed. Their narratives were similar in content and style, though even relatively sophisticated narratives from the autistic group often contained bizarre or idiosyncratic material. Compare the following narratives from autistic and DS subjects of the same verbal level:

4. The boy was trying. . . The lady had got her paycheck with her cash and then she heard a noise like . .(bangs on table) and then she left and then the boy was trying to steal her money and then the boy was caught. I'm not. . . No one catched me from stealing.

   (Autistic male, CA:15;10, Verbal MA:7;7 Nonverbal MA:9;6)

5. OK, like the secretary was in the office and she looked at the papers. She was tired and she went for a walk and she heard a knock on the door and she went out and the thief come in looking through the files and the papers and her purse. The money and then she panicked and the thief got her money. The lady came up behind her and went, "Oh" like

that (raises arms in the air). She went back and gets something and says, "Stop it, stop it!" and so he dropped the money down and the thief went out.

(Down Syndrome female CA:17;11, Verbal MA:7;7, Nonverbal MA:6;5)

Though it is somewhat less elaborated than that of the DS subject, the autistic subject's narrative includes the basic plot elements. At the end, however, the speaker shifts focus from the story to himself with an inappropriate comment ("I'm not. . .No one catched me from stealing"). This apparent confession of criminal activity represents a departure from the rhetorical mode of the story - a pragmatic violation.

Use of Gestures in Narratives

Both groups used gesture with their narratives. Gestures fell into three general categories: demonstrations, emphatic gestures, and the "talking hand". Demonstration gestures included all indicating gestures such as pointing or touching, as well as pantomime. Emphatic gestures were less well-defined and were used to emphasize something being said or to capture attention. These gestures usually took the form of hands waving around the head or one hand waved toward the experimenter. The final gesture category was only exhibited by several of the more impaired autistic subjects. The gesture was dubbed "The Talking Hand" because the subject would hold up a hand and move the fingers as if there were a puppet on the hand, opening and closing its mouth. However, the hand movements did not correspond with the subject's narration (i.e., the child was not narrating dialogue), and the gesture was vague and poorly formed.

DS subjects were found to use significantly more demonstrative gesture than autism subjects [$t(30)=-2.44$; $p<.05$]. Emphatic gestures were used

equally by the two groups. Five of the sixteen autistic subjects exhibited the "Talking Hand" gesture; no DS subjects used it. Because the gesture was of low frequency, Chi Square analysis was used to assess differences between the groups. Significantly more autistic subjects used this gesture than DS subjects (χ^2=5.92, $p<.02$).

Response to Follow-up Questions

There was a consistent pattern in the responses to follow-up questions across the three question types. Persons with autism were significantly more likely to produce responses that were bizarre, inappropriate or irrelevent for each question type (see Table 3). The two groups did not differ significantly in the percentage of no responses and more appropriate responses. Data were skewed by the presence of outliers in the autistic group for some response categories (e.g., two subjects in the autistic group who account for most of the "creative" responses to the speculative questions). Although there was a trend towards significant differences in the higher level response categories, actual differences may have been overshadowed by within group variances.

Insert Table 3 about here

The pragmatic difficulties experienced by subjects with autism were apparent in their responses to the questions. There appeared to be several reasons for inappropriate responses. Echolalic answers were often given when the subject had difficulty understanding the question. These may have served a turn-taking function when the subject recognized a need to respond, but was unable to answer appropriately (McEvoy, Loveland & Landry, 1988). In some instances the inappropriate response was clearly a guess (ex. How did the chicken feel when she was sitting on her nest? A: I don't know... mad.). In

the autistic group, mistaken guesses often reflected a failure to comprehend meaningful aspects of the story, such as characters' affect or the reasons for their actions. (By contrast, inappropriate responses by DS subjects, when they occurred, tended to be guesses resulting from poor comprehension of the question.) In other instances inappropriate responses seemed to reflect poor awareness of social expectations (ex. What would you do if someone took something of yours? A: Kill them.).

Frequently, however, responses suggested little awareness of the listener's needs (ex. What was the chicken doing at the beginning of the story? A: The baby bird was in the egg, but was it sleeping in the egg?). In these instances, the response failed to address the point of the question and so was not informative for the listener.

DISCUSSION

These results show that subjects with autism were to some extent able to interpret the meaningful events of a story presented by puppets or actors and to relate the story orally to a listener. There were no differences between the autistic and DS groups in structural characteristics of narratives, such as number of story events included. Although there were similarities between autistic and DS subjects in narrative skills, autistic subjects also exhibited pragmatic deficits that may be uniquely related to their disorder. Pragmatic deficits were most often manifested when autistic subjects introduced material into the narrative that was unrelated to the story, bizarre, or otherwise inappropriate. This problem was rarely observed in the language matched mentally retarded comparison group, suggesting that it is more characteristic of autism. These pragmatic violations suggest a failure to understand both what a story is and what it means to tell it to someone else.

The follow-up questions to assess comprehension of the story's meaning revealed few significant differences between the groups, in part because of large within-group variance. They do, however, suggest an overall pattern. autistic subjects were consistently more likely to give inappropriate or irrelevant answers to all question types than were DS subjects. There was also a non-significant trend for DS subjects to give more answers that fell within the highest level categories for each question type.

Although DS subjects gave fewer inappropriate responses, it is not possible to conclude that DS subjects necessarily had better comprehension of story events than did autistic subjects. Rather, the greater number of inappropriate answers by autistic subjects to all question types seemed to reflect difficulty responding appropriately, as often as it did lack of comprehension. However, it is clear that some of the autistic subjects failed to perceive the presentation as a story, wholly or in part, which suggests that their comprehension of the events was very limited.

Conclusions

The results of this study suggest that the narrative speech of higher functioning persons with autism is in some ways similar to that of language-matched mentally retarded persons, and that subjects in both groups have significant deficiencies in narrative speech. They also suggest, however, that even when closely matched on language level, the groups differ markedly in pragmatic aspects of narrative speech.

Baltaxe (1977), in a study of dialogues with autistic adolescents, identified three areas of impairment in language use: 1) the speaker-hearer role relationship, in which the speaker must be aware of the hearer's point of view, 2) the rules of conduct governing a dialogue, including acceptibility and politeness, and 3) "foregrounding" and "backgrounding", or the ability to

distinguish old and new information in the conversational context. Results of the present study support Baltaxe's findings and extend them to the task of narrative story-telling. They are also consistent with the finding of Loveland, Tunali, Kelley & McEvoy (in press) that verbal autistic persons have difficulty selecting and organizing information to be presented to a naive listener, perhaps because they are unable to anticipate what the listener needs to know. The results also tend to support the "theory of mind" model of social impairment in autism (Baron-Cohen, Leslie, & Frith, 1985; Baron-Cohen, 1988), which states that autistic persons have little awareness of others' mental states and so are unable to predict or understand their actions.

Results of this study may also have implications for the ways in which persons with autism interact in a natural social context. In ordinary conversation it is common to talk about events one has experienced. To do so, one must first understand a set of events in a meaningful way and then perceive their relevance to a particular topic. Only then can an anecdote be successfully formulated and presented. For persons with autism, however, the cultural meanings and context of many events may be lost. Thus it may be very difficult for them to select appropriate material to relate, to screen out irrelevant material, and to distinguish idiosyncratic meanings from culturally accepted meanings. As a consequence, their conversational speech is often inappropriate and uninformative to the listener.

Finally, these findings serve to emphasize the difficulty with which persons with autism develop an awareness of cultural conventions such as story-telling. To some extent, an understanding of the concepts of "story" and "fiction" may depend on the prior attainment of pretend play. Future studies may shed light on this possiblity by examining skills leading to the development of narrative story-telling in persons with autism.

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Table 1

Chronological Age, Verbal Age Equivalent, and Nonverbal Age Equivalent in Months for Subjects with Autism and Down syndrome

	Autism (n=16)			Down Syndrome (n=16)		
Subj. Pair	CA	Verbal AE	Nonverbal AE	CA	Verbal AE	Nonverbal AE
01	194	91	114	215	91	77
02	324	99	93	151	92	78
03	171	94	102	194	91	77
04	252	90	90	217	92	87
05	160	81	102	154	86	75
06	208	79	84	170	73	72
07	102	72	72	208	72	84
08	114	67	60	122	66	66
09	69	67	69	156	63	72
10	77	66	63	167	62	70
11	104	62	96	144	58	84
12	99	61	99	120	54	65
13	167	59	103	147	54	57
14	83	59	79	106	53	57
15	345	57	66	128	52	75
16	198	52	66	145	51	60

	Autism		Down Syndrome	
	Mean	SD	Mean	SD
CA	162	84	159	34
Nonverbal AE	82	15	72	9
Verbal Composite AE	72	15	69	16

Table 2

Descriptive statistics for narratives

	autism		Down Syndrome			
	Mean	SD	Mean	SD	t(30)	p=
Number of words in narrative	60	39	61	32	-.23	ns
Number of objects or characters mentioned (max.=5)	3.3	1.0	3.6	1.0	-1.31	ns
Number of story events recalled (max.=12)	4.0	3.0	5.0	2.7	-1.27	ns

Number of subjects exhibiting errors in language use.

	autism	Down Syndrome
Unclear or ambiguous references to characters or events	8	9
"External" references	6	1*
Misinterpretations of events	5	6
Repetitions of information	5	6
Intrusions of irrelevant information	4	7

* =4.56, p<.05

TABLE 3 Mean percentage of responses in to follow-up questions by category.

Concrete/Factual Questions

Response Category	autism		Down Syndrome		t(30)	p=
	$\bar{x}$	sd	$\bar{x}$	sd		
No Response	2	5	5	11	-.96	.34
Bizarre/Inappropriate/Irrelevent	37	27	10	14	3.48	.002
Unfocused/Marginal	25	16	32	21	-1.12	.27
Minimally Adequate	26	25	30	17	-.54	.59
Adequate, Well-produced	10	17	23	24	-1.69	.10

Emotion/Motivation Questions

Response category	autism		Down Syndrome		t(30)	p=
	$\bar{x}$	sd	$\bar{x}$	sd		
No response	9	19	8	15	.17	.86
Bizarre/Inappropriate	16	19	4	8	2.39	.02
Concrete	22	22	29	22	-.92	.36
Stereotypical	27	22	17	20	1.40	.17
Adequate/Appropriate	26	26	42	29	-1.68	.10

Speculative/Extrapolative Questions

Response category	autism		Down Syndrome		t(30)	p=
	$\bar{x}$	sd	$\bar{x}$	sd		
No response	19	31	14	22	.49	.62
Bizarre/Inappropriate	22	29	2	6	2.77	.01
Adequate	32	23	39	27	-.81	.42
Creative	27	28	45	37	-1.57	.13

Appendix A

Sequence of Events in the Stories.

The Chicken and the Fox (puppet show)

The chicken is on her nest with her egg. The chicken kisses the egg and says, "I love my egg. I can't wait for my baby to hatch." The chicken yawns and says, "I sure am tired of sitting here, I wish I could take a walk." The chicken hears a loud noise and looks startled. She says, "I better go see what that was" and leaves. The fox comes in and says, "I gotta find something to eat." He sniffs around, finds the egg and says, "Eggs are yummy." He tries to take the egg. The chicken returns and sees the fox. She gets a hammer and hits the fox. The fox leaves and the chicken returns to the nest and says, "That was a close one."

The Secretary and the Thief (video skit)

The secretary is at her desk with her money. She is counting the money and says, "I love my money. I'm glad I got paid; now I can pay my bills." The secretary yawns and says, "I sure am tired of sitting here, I wish I could take a walk." The secretary hears a loud noise and looks startled. She says, "I better go see what that was." and leaves. The thief comes in and says, "I want to find something to steal." He looks through the desk, finds the money and says, "Great, money!" The secretary returns and sees the thief. She gets an umbrella and hits the thief. The thief leaves and the secretary returns to her desk and says, "That was a close one."

Appendix B

Coding categories for each type of follow-up question and sample responses.

Questions pertaining to concrete or factual events in the story.

Sample Question: When the thief was taking the money, what else happened?

Code	Category	Sample Response
0	No Response	
1	Irrelevant/Innapropriate/Bizarre	What else happened? (echolalia)
2	Marginal or loosely associated with the question	He had the secretary, she said, "Agh" and she hit the umbrella?
3	Minimally Adequate	Tried to hit him with the umbrella.
4	Adequate/ well-produced response	He was going through the money and the secretary came back in behind him, after that the secretary went back out and got a ruler and says, "Stop thief, stop" and he dropped the money and the thief went out.

Questions pertaining to emotion or motivation of characters.

Sample question: How did the chicken feel when she saw the fox?

Code	Category	Sample Response
0	No Response	
1	Bizarre/Inappropriate Response	Frying fried chicken. Talking.
2	Concrete responses	She chased him away.
3	Stereotypical Responses	Fine
4	Adequate/Appropriate Responses	She was mad.
		She was scared he would eat her egg.

Appendix B (continued)

Questions requiring speculation or extrapolation from the story.

Sample Question: What if the fox came back?

Code	Category	Sample Response
0	No Response	
1	Bizarre/Innapropriate Response	You walk with it.
		I would bite somebody, I would bite the kermits off their houses.
2	Adequate Responses	Chicken would get mad.
		Chicken would hit him with the hammer.
		Fox would eat the egg.
3	Creative Responses	Call the police, call 911.
		Chicken could lock her door and not let him in.